

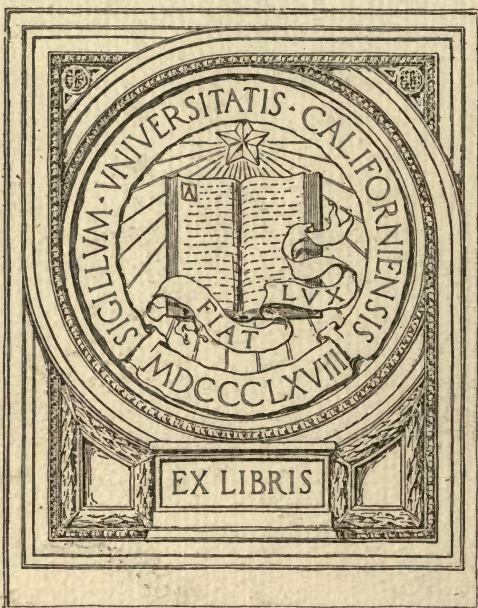
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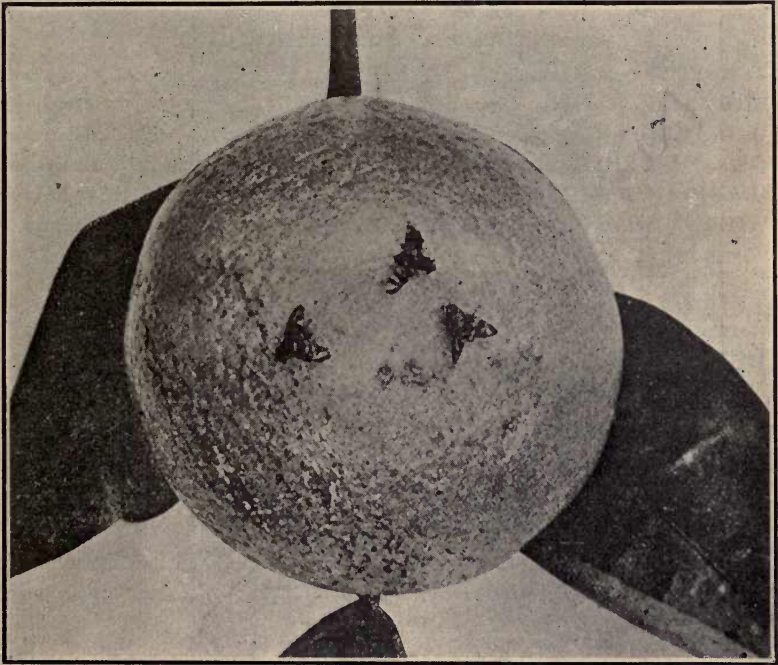
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CALIFORNIA STATE COMMISSION OF HORTICULTURE

J. W. JEFFREY, Commissioner

A FRUIT FLY MENACE

(Ceratitis Capitata)



ORANGE SHOWING ADULT FRUIT FLIES AT REST.
AFTER W. B. GURNEY, AGR. GAZETTE, N. S. W.

CALIFORNIA



SACRAMENTO

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CALIFORNIA STATE COMMISSION OF HORTICULTURE.

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A FRUIT FLY MENACE.

Compilation by O. E. BREMNER.

The fruit growers of the State of California have realized during the past few years, more especially, that the fruit industry is bearing a great burden of tax from the source of insect pests and diseases. The advent of even threatened invasion of any new pest is therefore viewed with great alarm, and justly so. Even our state and county quarantine forces have been more alert and careful in their inspection duties since the White Fly (*Aleyrodes citri*) outbreak three years ago at Marysville, Oroville, and Bakersfield.

While we know that our fruits are attacked by many serious pests, much more serious are those which are now just outside our borders, and but for the utmost vigilance will gain admittance to our State. This leaflet is, therefore, issued with the intention of sounding a warning against what is undoubtedly the most destructive and hardest to combat of all insect pests, namely, the fruit flies. The three menacing our State at present are the Morelos orange maggot (*Trypeta ludens*) of Mexico, the Melon Fly (*Dacus cucurbitæ*), and Mediterranean Fruit Fly (*Ceratitidis capitata*) of the Hawaiian Islands. It is of the last named fly that we have the most fear, and to which we wish to particularly call your attention.

In October, 1910, we received the following letter from the Board of Commissioners of Agriculture and Forestry, Honolulu, dated October 6, 1910:

"State Commissioner of Horticulture, Capitol Building, Sacramento, California:

SIR: It is with the greatest regret that I have to inform you of the appearance on this island of the Mediterranean Fruit Fly (*Ceratitidis capitata*). At a meeting of the Board of Agriculture and Forestry, held yesterday, I advised the Board to notify the California Commission of Horticulture, and now officially do so by their order.

* * * * *

Yours very truly,

(Signed) EDWD. M. EHRHORN,
Supt. of Entomology."

The seriousness of this pest can only be comprehended when we take into consideration the fact that practically every known fruit and vegetable, both cultivated and wild, is attacked by this insect. It is essentially a stone fruit pest, but does not limit its diet to these fruits, as shown by the following article:

(T. W. KIRK, NEW ZEALAND DEPARTMENT OF AGRICULTURE. FRUIT FLIES.)

"Any person finding a white pointed maggot resembling the maggot of the Blow Fly in fruit, is requested to at once send fruit and insect to this office.

The impossibility of applying remedial measures has led Inspectors Benson and Boller of the Queensland Department of Agriculture to conduct a series of experiments to endeavor to discover some substance which would act as a deterrent to the female when egg laying and to protect the crop. The results are, however, disappointing. The following is their report:

* * * * *

In Western Australia and in New South Wales nothing has been found of any use against the fly. At the Cape of Good Hope the only successful method has been covering the fruit with mosquito curtain whilst the fruit was ripening. * * * We have now had to burn consignments of the following fruits, because they were infested with this dreaded maggot:

- | | | |
|--------------|-----------|----------------|
| Peaches. | Apricots. | Nectarines. |
| Cherries. | Pears. | Apples. |
| Mangoes. | Shaddock. | Mammee-apples. |
| Pineapples. | Tomatoes. | Loquats. |
| Persimmons. | Plums. | Mandarins. |
| Oranges. | Bananas. | Maupi fruit. |
| Grenadillas. | Figs. | |

Should this pest ever become established here it would mean the ruin of the stone fruit industry of the north. It will be seen that practically all varieties of fruit are attacked, and the measures taken to keep this fly out of New Zealand can not be too severe.

Some persons evidently quite without knowledge of the subject, have expressed the opinion that New Zealand is too cool for the Fruit Fly to breed. There is absolutely no ground for such an opinion to rest upon, as the following information will show :

(He then gives statistics showing that adult flies have been bred in temperatures down to 32 Fahrenheit.)

In winter, however, I have had the insect remain in chrysalis stage for seven months and then emerge." * * *

Mr. Kirk's statements alone are convincing and alarming enough, but we have much more of a like character. Mr. Lounsbury of Cape Town, South Africa, informed us while here two years ago that the Government was furnishing growers netting to cover over their fruit trees, as this was the only way they could produce it free from maggots. Even as far back as 1899 this method was pursued in Natal and Cape Colony. During that year Mr. Lounsbury states that only 4,000 yards two yards wide was used, and that the growers did not take to this method of eradication.

In Western Australia the Government bought all the fruit for one season in an infested district and had it all burned in the hopes of stamping out the pest. But the next year the fly appeared quite as numerous as ever. This was, of course, accounted for by the fact that it was impossible to destroy all the wild fruit and berries, etc.

Mr. Gurney of New South Wales gives us some interesting data regarding the resistancy of this fly to any form of treatment. Among other things he states :

Burying fly-infected fruit can not be advocated. Pupæ buried six, eight, and twelve inches below the surface of the soil hatched, and adult flies readily made their way to the surface in all cases.

Burning or boiling infected fruits is the most effective and satisfactory method of destruction. The maggots are not readily destroyed by liquids. After six hours in salt water some maggots pupated and developed into flies. Infected fruit was submerged in salt water (sea water) for periods varying from six to forty-five hours. In each case a large percentage of the maggots therein developed into adult flies. Some maggots immersed in methylated spirits for up to half an hour survived, and some survived dipping in kerosene. Though eventually the maggots would perish in the above fluids, yet these experiments indicate that no casual treatment (such as throwing infected fruit into a creek, wetting fruit with oils, etc.) can be considered a safe method for the destruction of maggot-infected fruit.

There is no doubt as to the seriousness of this pest in the minds of the Hawaiian authorities, as shown by the following quarantine rule :

RULE VII.

Rule and regulation by the Board of Commissioners of Agriculture and Forestry concerning the prevention of distribution of the Mediterranean Fruit Fly from Oahu to the other islands.

The Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii hereby make the following rule and regulation :

SECTION 1. For the purpose of preventing the spread of the Mediterranean Fruit Fly (*Ceratatis capitata*) from the island of Oahu, territory of Hawaii, where the same has established itself, to any other island in the territory, all persons and corporations are hereby prohibited from carry or shipping oranges, lemons, limes, mangoes, alligator pears, guavas, peaches or other soft-meated fruits grown on said island of Oahu to any other island in the territory.

SEC. 2. Any person or corporation violating the above rule shall be guilty of a misdemeanor, and shall be punished by a fine not to exceed five hundred dollars, as provided by section 390 of the Revised Laws of Hawaii as amended by Act 82 of the Session Laws of 1905 and Act 112 of the Session Laws of 1907.

SEC. 3. This regulation shall take effect from and after the approval thereof by the Governor.

Approved :

W. F. FREAR,
Governor of Hawaii.

Honolulu, Territory of Hawaii, November 21, 1910.

A few testimonials as to the seriousness of this pest :

FROGGATT : INSECTS OF AUSTRALIA.

* * * The Mediterranean Fruit Fly (*C. capitata*), first recorded from oranges brought from the Azores to London; was described by Macleay in 1826; it has a wide range, and was introduced in New South Wales some time ago; it is one of the most serious pests that orchardists have to fight. * * *

LEA : INSECTS AND FUNGUS PESTS OF ORCHARD AND FARM, TASMANIA.

* * * In Australia there are two very serious pests of fruit that have not yet established themselves in Tasmania. These are the Queensland Fruit Fly (*T. tryoni*) and the Mediterranean Fruit Fly (*C. capitata*). They both attack ripening fruit, and in some parts practically destroy the entire fruit crops. * * *

ANNUAL REPORT, 1908, DEPARTMENT OF AGRICULTURE, NEW ZEALAND.

T. W. KIRK, Biologist.

Mediterranean Fruit Fly (*Ceratitis capitata*). This destructive pest is most commonly found in imported fruit, and no variety seems to be immune from its attacks. The latest of its hosts has been shown to be figs. A consignment of figs was condemned on its arrival at Wellington, and from 17 figs 241 flies were bred out.

DESCRIPTION OF MEDITERRANEAN FRUIT FLY.

From Bulletin No. 24, by WALTER FROGGATT, Department of Agriculture, N. S. W.

Ceratitis capitata, in the first place, is a citrus fruit pest, but as it has spread has learned to feed upon all kinds of fruit; and after the orange may be known as a peach pest. At the present time there is hardly any kind of fruit that it has not been bred from, so that any list of infested fruit is quite superfluous. In fact, they have been bred from a number of native fruits; but the native fruits are so rare, comparatively speaking, in the greater part of the fruit-growing districts of Australia, that they are not an important factor in the spread of the pest, and are more likely to be infested themselves from an adjacent orchard than to be a center of infection to the orchard. *Ceratitis capitata* has been described in a more or less imperfect manner a great many times, but it is better known from the beautiful colored figures published by Macleay, and again by Breme, when he called it *C. hispanica*. As several new species have been added to the members of this genus, and some confusion exists about the identity of the earlier described species, I propose not to give a scientific description, but a popular one, that any one can grasp with the insect before them.

Size, four to five mm., about the size of an average house fly, but looking somewhat smaller when dead, because the body shrinks up beneath the thorax. General color, ochreous yellow, lighter on the sides of thorax and basal joints of the antennæ. The eyes of the usual reddish-purple tint, with a blackish blotch in the center of the forehead from which spring two stout black bristles, a fine fringe of similar bristles round the hind margin of the head, with some coarser ones

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curving around in front of the head between the eyes. The thickened basal joints of the antennæ pale yellow, the terminal segments black to the tips. The dorsal surface of the thorax convex, raised, and broadly rounded with the scutellum, the ground color creamy white to yellow, marbled with shining black blotches forming an irregular mosaic pattern, the lighter portions clothed with very fine white bristles. These light-colored bristles more lightly scattered over the dark areas, and the whole bearing large, stout black bristles thickest on the black surface.

In many of the pictures of this insect the black areas are drawn as if they were projecting bosses or knobs, but this is incorrect; the whole forms a regular rounded surface.

The wings are broad, semi-opaque, with the extreme base blotched with ochreous or brownish yellow, with the rest of the basal area curiously marked with black, forming dark lines of the radiating nervures with dark lines and spots between; beyond this is a broad, irregular transverse ochreous band, slightly lined with black, blotched at the extremity; another similar shaped and colored blotch runs along inside, but not in contact with the costal nervure, also black toward the extremity in the angular space. Between these bands is another shorter black band running parallel with the first transverse band.

The oval abdomen is clothed on the upper surface with fine, scattered black bristles, and has two rather broad transverse silvery white bands on the basal half of the body. The male differs from the female in being furnished with a pair of stalked appendages standing out in front of the head in a line with the front margin of the eyes, the extremities of which filaments are produced into spatulate appendages black, finely striated, and diamond shaped.

The living fly is an active little creature, running about over the foliage or fruit on the trees, with its wings drooping down on the sides of the body. When disturbed it has a short flight, seldom flying more than a few yards at the most, and it often returns to the same spot.

THE MELON FLY (*Dacus Cucurbitæ*).

During the month of July, 1902, the writer was in the Hawaiian Islands, and on seeing some fine-looking watermelons in a Honolulu market, inquired the price as an intending purchaser. Imagine the surprise on being informed by the shopman that they were one dollar apiece. We afterward learned that this was due to the ravages of a fruit fly, commonly called the Melon Fly (*Dacus cucurbitæ*) and was told that it was practically impossible to raise melons or cucumbers except under glass or cloth, and that tomatoes are nearly as seriously infested.

This pest attacks practically all the cucurbits, tomatoes, string beans, etc., also some fruits. We have taken it in consignments from the Hawaiian Islands in the quarantine office at San Francisco in the following: Tomatoes, mangoes, cucumbers, squashes, and string beans. The writer personally counted 79 maggots in a single tomato in a shipment from Honolulu. So serious do we consider the danger from the introduction of this pest into California, that a quarantine order has been issued refusing admittance to California to all fruit or vegetables known to be subject to its attack.

The following is the order as issued by the State Commissioner of Horticulture:

QUARANTINE ORDER, NO. 4.
Pertaining to the Melon Fly (*Dacus cucurbitæ*).

SACRAMENTO, March 28, 1910.

WHEREAS, From information that has been received by this Commission, and the fact having been duly determined by the Commission, it appears that a certain fruit and vegetable fly known as *Dacus cucurbitæ* is prevalent in the Hawaiian Islands, and very destructive to watermelons, muskmelons, cucumbers, and tomatoes on these islands, and that the said *Dacus cucurbitæ* is not known to exist in the State of California; and

WHEREAS, The introduction of this fly into the State would entail great and irreparable losses to the horticultural products subject to its attacks; and

WHEREAS, The most rigid inspection can not determine the presence of the larva maggot of this fly without the destruction of the fruit or vegetable which may be infected; therefore

It is ordered, That a horticultural quarantine be, and is hereby established against watermelons, muskmelons, cucumbers, and tomatoes imported from the Hawaiian Islands or other territory known by the State Commission to contain infection of the *Dacus cucurbitæ*, and all deputies of the State Commission of Horticulture, County Horticultural Commissions, and horticultural quarantine officers are hereby instructed to hold all such fruits or vegetables above described for exportation out of the State or to be destroyed, as may be directed by the owner or consignee.

J. W. JEFFREY,
State Commissioner of Horticulture.

Approved:

J. N. GILLETT,
Governor of the State of California.

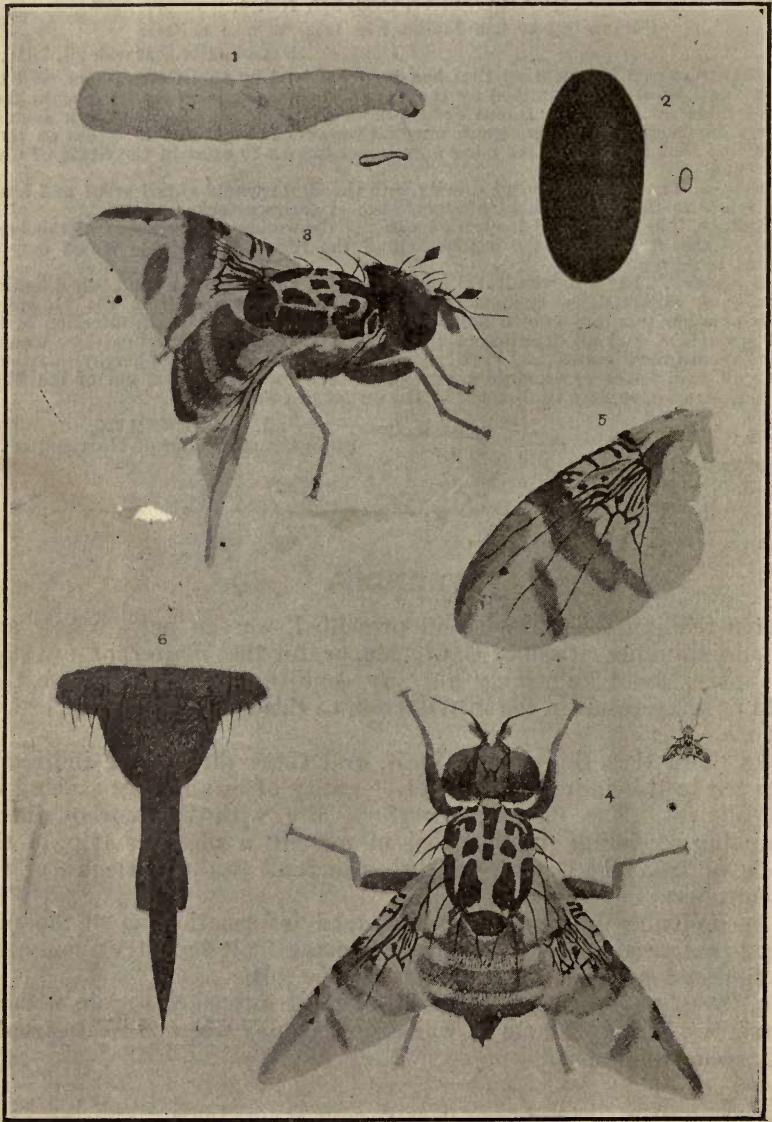
WARNING.

After reading the facts herein presented, we can not see how any patriotic, thinking citizen of California, or, for that matter, of any state or country, could knowingly aid any condition or circumstance that would possibly result in the introduction of this fly, either to this or any other state.

It is plain that shippers of fruit, and those directly or indirectly interested in this industry, will not be guilty of in any way causing its establishment. The danger, therefore, lies with the unacquainted, unthinking traveling public, who, in making a pleasure trip to the islands, or from the Orient, will bring in fruit to their friends, or for their own use.

It is undoubtedly your duty to spread information as to the real danger that now exists to California's great fruit industry from such unintentional carelessness.

We, therefore, solicit the aid of all of those interested to join with us in sounding at once a note of warning that may avert the catastrophe which seems imminent.



MEDITERRANEAN FRUIT FLY; ALL STAGES.

After C. W. Mally, Cape Town.

NOTE.—We are indebted to the Board of Commissioners of Agriculture and Forestry of Honolulu, Hawaii, for the use of the two plates illustrating the Fruit Fly in this leaflet.

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